
Priest River Subbasin Assessment and Total Maximum Daily Load



**Idaho Department of
Environmental Quality**

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Priest River Subbasin Assessment and Total Maximum Daily Load

Prepared by

**Glen C. Rothrock
Watershed Coordinator**

**Coeur d'Alene Regional Office
2110 Ironwood Parkway
Coeur d'Alene, Idaho 83814**

**Idaho Department of Environmental Quality
1410 North Hilton Street
Boise, Idaho 83706-1255**

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ACRONYMS USED IN THIS REPORT

Government Agencies and Citizen Groups

BAG	Panhandle Basin Advisory Group
IDEQ	Idaho Department of Health and Welfare, Division of Environmental Quality
DEQ	Idaho Department of Environmental Quality (department status as of June 2000)
EPA	U.S. Environmental Protection Agency
IDFG	Idaho Department of Fish and Game
IDH&W	Idaho Department of Health and Welfare
IDL	Idaho Department of Lands
IDPR	Idaho Department of Parks and Recreation
IDWR	Idaho Department of Water Resources
IWRB	Idaho Water Resources Board
UI	University of Idaho
USDA-SCS	U.S. Department of Agriculture, Soil Conservation Service (renamed National Resources Conservation Service, NRCS)
USFS	U.S. Department of Agriculture, Forest Service
USF&WS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WAG	Priest Lake Watershed Advisory Group (same group as Priest Lake Management Plan Steering Committee)

Other

BMPs	Best Management Practices
BURP	Beneficial Use Reconnaissance Project
CWE	Cumulative Watershed Effects process
DO	Dissolved oxygen
EC	Electrical conductivity
FPA	Idaho Forest Practices Act
HI	Habitat Index (DEQ)
HUC	Hydrologic Unit Code
MBI	Macroinvertebrate Biotic Index (DEQ)
NIPF	Non-industrial Private Forest
RIBI	Reconnaissance Index of Biotic Integrity (DEQ)
RPV	Residual Pool Volume
SMA	Special Management Area
SMP	Special Management Problem
SSBMPs	Site Specific Best Management Practices
SSOC	Stream Segments of Concern
TMDL	Total Daily Maximum Load
TN	Total nitrogen
TP	Total phosphorus
WBAG	Water Body Assessment guidance (DEQ)

CONVERSION FACTORS APPLICABLE IN THIS REPORT

Multiply	To	Obtain
Metric		English
centimeter (cm)	0.3937	inch
cubic kilometer (km ³)	0.2399	cubic mile
cubic meter (m ³)	35.31	cubic foot
hectare (ha)	2.47	acre
kilogram (kg)	2.205	pound
kilogram per hectare (kg/ha)	0.8922	pounds per acre
kilometer (km)	0.6214	mile
liter (l)	1.057	quart
meter (m)	3.281	foot
metric ton	1.102	ton (short)
square meter (m ²)	10.76	square foot
English		Metric
Acre	0.405	hectare
acre-feet (ac-ft)	1,219.68	cubic meters
cubic feet per second (cfs)	0.028	cubic meters per second
feet (ft)	0.3048	meters
mile (mi)	1.609	kilometer
square mi ²	2.6	square kilometer

To Convert °C (degrees Celsius) to °F (degrees Fahrenheit), use the following equation:

$$^{\circ}\text{F} = (1.8 \times ^{\circ}\text{C}) + 32$$

ABBREVIATED MEASUREMENT UNITS

ac	acre
ac-ft	acre-feet
cfs	cubic feet per second
cm	centimeter
ha	hectare
kg	kilograms
kg/ha/yr	kilograms per hectare per year
l	liter
m	meter
m ²	square meter
mg/L	milligrams per liter
mi ²	square mile
mL	milliliter
m. ton	metric ton
μg/L	micrograms per liter
μmhos	micromhos per centimeter (electrical conductivity)

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Information and insight to watershed characteristics in this Priest River Subbasin Assessment and TMDL came from many sources. I would like to thank personnel in the following offices for taking the time and effort in supplying information for this report: U.S. Forest Service at the Priest Lake Ranger District, Sandpoint Ranger Station, and Coeur d'Alene Supervisors Office; Idaho Department of Fish and Game in the Coeur d'Alene Regional Office; Idaho Department of Lands in their efforts at conducting the Cumulative Watershed Effects (CWE) process in numerous Priest River basin watersheds; National Resources Conservation Service in Sandpoint; and the Idaho Soil Conservation Commission in Coeur d'Alene.

-Glen Rothrock

SECTION 1. EXECUTIVE SUMMARY

Water Quality at a Glance

<i>Hydrologic Unit Code</i>	17010215 - Priest River Basin (Figure 2-1 & 2-2)
<i>Basin Area</i>	981 square miles
<i>Listed Water Quality Limited Segments</i>	Trapper Creek, Two Mouth Creek, East River, Tango Creek, Reeder Creek, Kalispell Creek, Lamb Creek, Binarch Creek, Lower West Branch Priest River, Lower Priest River
<i>Beneficial Uses Affected</i>	Cold Water Biota, Salmonid Spawning
<i>Pollutants of Concern</i>	Sediment, temperature
<i>Known Land Uses</i>	Forestry, agriculture, urban

Prolog

A draft Subbasin Assessment (SBA) for the Priest River basin was published in July 2000, and a draft SBA and Total Maximum Daily Load (TMDL) was published in December 2000. These two documents were reviewed by: the Panhandle Basin Advisory Group (BAG); the Priest Lake Watershed Advisory Group (WAG); TMDL coordinators for Idaho Department of Environmental Quality (DEQ) and the Environmental Protection Agency (EPA); and land managers in the basin such as the U.S. Forest Service (USFS), the Idaho Department of Lands (IDL), and certain private land owners. In accordance to EPA guidelines for TMDLs, the draft SBA and TMDL (December 2000) underwent an advertised 45 day public comment period that ended January 29, 2001. This was followed by an advertised public meeting on January 31 in the Priest Lake area hosted by the Priest Lake WAG. Comment packages and oral comments were received regarding the determined status of: streams found to be in Full Support of their beneficial uses and thus proposed for removal from the Idaho §303(d) list, and streams found as Not Full Support of a beneficial use(s), or impaired, and thus would undergo a TMDL process. A summary of significant comments received, and the DEQ response to those comments, are found in Appendix B of this document.

This final version of a required TMDL document for the Priest River basin, i.e. a Subbasin Assessment and TMDL, represents a few modifications regarding determined support status of §303(d) listed streams that were presented in the two previous draft documents. These modifications were in part based on additional information collected and analyzed through the summer of 2000, including numerous electro-fishing surveys by DEQ, and also in response to comments received, and from recommendations by the Priest Lake WAG. The modifications in this final TMDL compared to draft versions are:

- the draft recommendation to de-list Kalispell Creek (December 2000) is changed to TMDL development,
- the draft recommendation to de-list Binarch Creek (December 2000) is changed to deferral of a support status call until further fish population data is gathered during 2001, and
- Lamb Creek, which was recommended for TMDL development in the draft SBA (July 2000), is now considered as Full Support of cold water biota beneficial use based on DEQ electro-fishing results gathered in 2000.

Introduction to the Subbasin Assessment and Total Maximum Daily Load Process

Section 303(d) of the Federal Clean Water Act (CWA) requires states to prepare a list of waters not meeting state water quality standards. These are impaired waters which do not fully support one or more of their beneficial uses of: domestic water supply; recreation in or on the water; cold water biota (i.e. cold water inhabitants such as insects, reptiles, and fish); and salmonid (trout) spawning. These water bodies may become impaired because of a pollutant input that has reached a level damaging the beneficial use. An example for northern Idaho streams is excess sediment input, which may cover gravel and cobble beds required for salmonid spawning, and may also fill in pools that are critical fish habitat. Based on section 303(d) requirements, it is contingent upon a State to: 1) identify impaired waters and what beneficial uses are being impaired, 2) determine the pollutant(s) causing the impairment, 3) determine the amount of pollutant entering the water body from both natural background sources and human-caused sources (pollutant load), 4) calculate and propose a pollutant load reduction such that the calculated annual load is one that a water body can assimilate without violating a state's water quality standards (Total Maximum Daily Load), and 5) proportionally allocate the TMDL among the various point and non-point pollutant sources.

In 1989 Idaho DEQ submitted to EPA its first §303(d) list as Appendix D of the 1988 Water Quality Status Report, a required biennial report under section §305(b) of the CWA. A stand-alone §303(d) report was submitted in 1992 with 31 water segments listed state-wide, none within the Priest River basin. The 1992 Water Quality Status Report (IDEQ 1992) did list all of the Priest River basin stream segments shown in the introductory box on page 1, except for Trapper Creek. Priest River basin stream segments listed in Appendix A and D of the 1992 report were considered to have Supported/Threatened, Partial Support, or Not Supported status among the various categories of beneficial uses. A history of the 1988 and 1992 §305(b) listings for Priest River basin streams are shown in Appendix A of this report.

Because of dissatisfaction by environmental organizations with the §303(d) process and progress in Idaho, litigation against EPA was initiated in 1993. In 1994 the EPA, in conjunction with state and federal agencies and also through the public comment process, developed a §303(d) list for Idaho that totaled 962 water body segments (streams, rivers, lakes and reservoirs) considered as water quality impaired or limited. This list included pollutants of concern and a State-wide priority ranking which took into account the severity of the pollution. The 1994 and subsequent 1996 §303(d) listing included ten water body segments in the Priest River basin; nine extracted from 1988 and 1992 §305(b) reports, and the addition of Trapper Creek. All segments were given a "low priority" status.

In response to the developments described above, DEQ initiated a program of comprehensively evaluating water bodies throughout the state to better determine which segments are water quality limited, and which water bodies are fully supporting their designated and existing beneficial uses, and thus should not be included on a §303(d) list (i.e. de-listed from the 1994/96 list). DEQ began a Beneficial Use Reconnaissance Project (BURP) which since 1994 has sent summer crews out to collect aquatic invertebrate samples, evaluate stream habitat conditions, and conduct electro-fishing surveys. A 1996 Waterbody Assessment Guidance (WBAG) was developed (IDEQ 1996), which provides a structured process to utilize BURP data, other fish sampling surveys, and basically any and all current and scientifically valid information available to make a judgment call on whether a water body segment is fully supporting its beneficial uses. Evaluation of this information in essence forms the Subbasin Assessment portion of a TMDL document. Progress on and results of DEQ's efforts, as well as modifications of the 1996 WBAG process, were presented in the DEQ 1998 §303(d) List (IDEQ 1999), approved by EPA in May of 2000.

Summary of Priest River Subbasin Assessment and TMDL

The Priest River basin is 981 square miles in area. The basin is primarily within the northwest corner of the Idaho Panhandle, in Bonner and Boundary counties (Figure 2-1). Headwaters of Upper Priest River originate within the Nelson Mountain Range of British Columbia, and headwaters of major streams on the western side of the basin originate in northeast Washington. The basin is flanked on the east by the Selkirk Mountain range, and bordered on the west by the mountain crest separating the Kaniksu and Colville National Forests. Elevation within the basin ranges from 2,075 ft at the city of Priest River to more than 7,000 ft within the Selkirks. There are approximately 1,315 miles of perennial streams in the basin, and a major lake complex, Priest Lake and Upper Priest Lake.

All §303(d) listed stream segments have been assessed through the BURP process. Other information from recent stream and watershed surveys was collected and summarized in this report, including: 1) fish population sampling conducted by the Idaho Department of Fish and Game, IDL, and the USFS, 2) stream habitat surveys and measurements conducted by USFS, and by a DEQ Use Attainability survey in 1992, 3) computer analysis of watershed features conducted through a Geographical Information System (GIS), with data supplied by USFS, IDL, and the U.S. Geological Survey, 4) data collected through an IDL - Cumulative Watershed Effects inventory on many of the listed watersheds, and 5) a stream bank erosion survey sponsored by DEQ and the Idaho Soil Conservation Commission. In addition to the §303(d) listed streams in the basin, BURP surveys and other information was available for many of the major streams in the basin which are not §303(d) listed.

Judgement of cold water biota and salmonid spawning beneficial use status for §303(d) listed streams was initially determined through the amended 1996 WBAG flow-chart procedure (IDEQ 1999). The first step in this procedure is to determine if there are major exceedances of numeric criteria cited in the Idaho Water Quality Standards. There are numeric criteria regarding stream temperature, as elevated stream temperatures may affect cold water related beneficial uses. In almost all cases, temperature sensors placed within basin streams provide a record whereby current Standards criteria are being exceeded for cutthroat spawning and incubation in July, and also EPA numeric criteria for bull trout rearing and spawning from July - September. However, temperature criteria are being reevaluated by DEQ, along with negotiations with EPA on setting agreed upon revised State standards. While stream temperature data is presented in this report, there are no §303(d) listing decisions.

The second step in cold water biota support status determinations is to examine the BURP Macroinvertebrate Biotic Index (MBI) scores. For the large majority of basin streams, MBI scores indicate Full Support ($MBI \geq 3.5$). There were no stream segments that had MBI scores ≤ 2.5 which indicates Not Full Support (impaired). For some streams the MBI was less than 3.5 (Needs Verification), and the next step in the amended WBAG flow chart is to examine fish population structure. In most cases the status call remained as Needs Verification because of the dominance of an introduced salmonid (brook trout) and suppressed populations of native cutthroat trout and bull trout. The next and final flow chart step examines the BURP Habitat Index (HI) scores. For most basin streams making it to this step, the status call remained as NV since the vast majority of basin HI scores were below the Full Support cutoff score of $HI < 100$.

Regardless of the support status call from the WBAG flow chart procedure, all §303(d) listed streams and watersheds were examined in the light of other additional information collected, in particular fish density and population structure data, stream habitat data, and results of watershed sediment yield calculations. Examination of such data as an important part of support status determinations is a procedure jointly agreed to by DEQ and EPA (McIntyre 2000), and is referred to as WBAG+.

Evidence suggests that in some basin streams, sediment, which is largely sand sized particles related to a dominance of granitic geology, is excessive. This has resulted in a high percentage of fines within spawning beds, reduction of pool volume, and channel systems out of equilibrium with characteristics such as channel widening along with stream bank cutting and erosion. In the Priest River basin, excess sediment and channel disequilibrium has been linked to: historic large fires; historic logging practices and initial construction of a transportation network to bring timber to market; current timber activities and the existing road network; agricultural practices such as wet meadow draining through cross ditches, channel straightening, and cattle access to streams; urbanization with clearing and excavation in riparian areas and construction of substandard private roads; and lack of road maintenance. Confounding the analysis of sediment effect on the biotic community are the issues of: legacy land use, fire, and natural geological conditions versus sediment input from current land use activities; and effects from the introduction of non-native competing salmonids including brook trout in streams and lake trout within Priest Lake.

Determinations of cold water biota beneficial use status for this report took into account both the WBAG results and a best professional judgment of whether the additional information (“+” of WBAG) indicated that excess sediment has impaired beneficial uses. Status call judgments fell into several categories of decisions and debate. Trapper Creek, Two Mouth Creek, and Tango Creek (all northern basin streams), were clearly Full Support including viable populations of native cutthroat trout. On the other hand, mid-western streams draining into Priest Lake, and lower western streams draining into Lower Priest River were more difficult to access because of low numbers or absence of cutthroat trout.

The mid western basin streams Lamb Creek and the upper reach of Reeder Creek had abundant brook trout, but absence of cutthroat trout. These reaches are judged as Full Support and recommended for de-listing based on adequate MBIs and brook trout populations. This decision may be disputed based on a fisheries management objective for recovery of cutthroat trout. Sediment source load calculations for Lamb Creek are included in this report because of a high current sediment load, which apparently is not affecting brook trout, but the current load would likely have to be reduced for establishment of cutthroat trout. Kalispell Creek on the other hand, exhibits low numbers of both brook trout and cutthroat, and is judged Not Full Support. However, sediment load calculations and USFS assessments suggest that the current sediment load is not the impairment factor. Regardless of this assessment of current sediment load, the Priest Lake WAG recommends that for any stream segment exhibiting NFS, a de-listing is not warranted and the watershed should undergo a TMDL. This report follows the WAG recommendation.

The lower western stream, Lower West Branch Priest River, has overall suppressed salmonid populations (main stem), in combination with a high current sediment load. A TMDL has been prepared for this stream. While the Middle Fork and North Fork of East River (lower eastern streams) are judged as FS, there appears to be a suppression of cutthroat trout in lower reaches of the two forks as compared to upper reaches (although fishing pressure and elevated water temperature may be a factor). Sediment source load calculations are included in this report for the Middle and North Forks as a resource for any future fisheries management efforts to strengthen the cutthroat population. Sediment reduction efforts in the Middle Fork may also become a fisheries management planning objective because the Middle Fork is the only lower basin stream in which bull trout are found.

Table 1-1 presents a summary of beneficial use status calls and §303(d) List recommendations that are detailed in this Subbasin Assessment and TMDL report. Included are four listed segments in which there is a request for deferment of status calls. These segments are: Reeder Creek from the middle reach to the mouth; the 2.5 mile main stem of East River; Binarch Creek; and the entire §303(d) listed length of Lower Priest River. Reasons for request of deferral are given in Table 1-1, and judgement of beneficial use status for these segments would be presented in the 2002 DEQ §303(d) List. Also, the §303(d) list for East River includes dissolved oxygen (DO) as a concern. There have been no recorded DO measurements taken in this stream system. Therefore, East River remains on the §303(d) list for DO.

Table 1-1. Results of Water Body Assessments for the Priest River Basin based on Application of the Available Data

§303(d) Listed Watershed	Assessed Support Status	Reasons segment to be de-listed for sediment as pollutant of concern	Reason that Segment is deferred for support status determinations
Trapper Creek	CWB and SS show FS.	CWB not impaired by sediment. SBA supports DEQ 1998 §303(d) de-listing.	N.A.
Two Mouth Creek	CWB and SS show FS.	CWB not impaired by sediment.	N.A.
Tango Creek	CWB and SS show FS.	CWB not impaired by sediment. SBA supports DEQ 1998 §303(d) de-listing. Also de-listed for Nutrients as pollutant.	N.A.
Binarch Creek	CWB and SS judged as NFS. Support status based on single BURP electro-fishing effort. INSI.	N.A.	Needs further fish survey within Binarch Creek Research Natural Area.
Kalispell Creek	CWB is judged as NFS . SS shows FS. TMDL developed	N.A.	N.A.
Reeder Creek: headwaters down to elev. 2680'	CWB and SS show FS.	CWB not impaired by sediment.	N.A.
Reeder Creek: elev. 2680' down to mouth	Needs laboratory analysis of 2000 BURP macroinvertebrate samples.	N.A.	Primary middle reach BURPed in year 2000. Data not yet available for status call.
Lamb Creek	CWB and SS show FS.	CWB not impaired by sediment. SBA supports DEQ 1998 §303(d) de-listing.	N.A.
Middle Fork East River	CWB and SS show FS.	CWB not impaired by sediment. SBA supports DEQ 1998 §303(d) de-listing.	Segment remains listed for dissolved oxygen. Needs DO measured.
North Fork East River	CWB and SS show FS.	CWB not impaired by sediment.	Segment remains listed for dissolved oxygen. Needs DO measured.
Main Stem East River	BURP MBI shows FS. INSI because of lack of fish sampling data.	N.A.	Needs a current fish survey. Needs DO measured.
Lower West Branch Priest River	CWB shows NFS. SS shows NFS in lower reach. TMDL developed.	N.A.	N.A.
Lower Priest River	Support status will be determined upon final acceptance of Idaho River Ecological Assessment methods. INSI	N.A.	Final acceptance of Idaho Rivers Ecological Assessment. River needs current fish survey by IDFG.

CWB = Cold water biota beneficial use
 SS = Salmonid spawning beneficial use
 FS = Full Support of beneficial use
 NFS = Not Full Support of beneficial use
 SBA = Priest River Subbasin Assessment
 N.A. = Not Applicable
 INSI = Insufficient Information to make a beneficial use status call